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ABSTRACT

The purposes of the report are to assess international rules currently available for compulsory settlement of environmental disputes and to describe a basis for jurisdiction by United Nations agencies over disputes not covered by existing rules. A history of international concern with the environment since the Stockholm Conference on the Human Environment in 1972 traces development of standards to deal with environmental problems and analyzes problems encountered in providing compulsory international machinery to settle disputes. Objectives of relevant provisions emanating from the Stockholm Conference are described as promoting cooperation among nations in environmental matters, encouraging states to accept responsibility for environmental damage in areas beyond their jurisdiction or control, and suggesting development of tests to evaluate environmental impact of potential or specific contaminants. The ineffectiveness of international environmental law in solving disputes is discussed. Major reasons identified as causes of this ineffectiveness include lack of compulsory procedures for third party setlement, unwillingness of states to submit to compulsory jurisdiction of international agencies, ambiguity of environmental laws, and the tradition of leaving enforcement of environmental laws to states. Suggestions for developing international jurisdiction by agencies of the United Nations include increasing the use of United Nations-approved technical expertise to solve environmental disputes, developing a United Nations system of classification of various threats to the environment on the basis of scientific evidence, ranking various pollutants according to seriousness, and undertaking a United Nations-sponsored critical inquiry into the relationship between science and international policy formation. (DB)

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# An Approach to the Development of International Jurisdiction to Deal with Environmental Problems

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The 1972 Stockholm Conference on the Human Environment demonstrated that the global environment is of international concern and called for the development of international standards to deal with environmental problems. During the following years the international community has made some progress in developing substantive international rules to deal with the more pressing issues of international concern, but it has done little to provide compulsory international machinery to settle disputes regarding the application of these rules. Disputes over the application of rules are certain to arise as the problems of the environment become more vital to the survival of nations.

It is the purpose of this paper to assess the international rules now available for the compulsory settlement of environmental disputes and to describe a basis for declarations of jurisdiction by United Nations political organs over others not covered by existing rules. This proposed basis is a version of the doctrine of international concern which has been employed to establish jurisdictions over disputes and situations threatening international peace and security. Whereas the use of the present doctrine of international concern requires an evaluation of the gravity of a dispute or situation and the immediacy of the threat it poses to international peace and security, the determination of international environmental concern could be based on a more scientific, and thus less political, assessment of the extent of environmental damage caused by the issue which is disputed. International organization jurisdiction to enter as a third party to bring pressures for settlement of a dispute or improvement of a bad environmental situation would be established by a conclusion based on scientific facts that a dispute or situation involved an agreed upon level of danger to the environment, just as international organization jurisdiction is now based on a finding, sometimes fraught with the political motivations of the international actors, that a dispute or situation is sufficiently grave and immediate to be called a "potential threat to the peace" requiring international intervention in a matter which may have been regarded as within a state's domestic jurisdiction.

An elaboration of this thesis requires a reference to relevant Stockholm provisions; an assessment of international law on the environment, with particular attention to procedures for third party intervention in dispute and situations; a summary explanation of the doctrine of international concern as it has developed in the twentieth century; a survey of the classifications of the various environmental threats and the assessment of their gravity that is in the process of being made by the scientific community; and the explanation of how these findings would be a suitable basis for determining international jurisdiction.

## Relevant Provisions of the Stockholm Conference

The Stockholm Conference on the Human Environment affirmed that problems of regional or global extent of those affecting the common international realm would require cooperation among nations and action by international organizations in the common interest.[1] It elaborated that approach with a declaration of principles and an action plan. Principle 21 captures the ambivalence of the states represented at the Conference, their attachment to the concept of sovereign rights within their territories and their acknowledgement of a shared and unified environment.[2]

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of their jurisdiction.[3]

The responsibility of states for environmental damage beyond their jurisdiction or control is generally conceded to be in great need of explication, and principle 22 deals with that.

> States shall co-operate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction of (sic) control of such States to areas beyond their jurisdiction.[4]

In addition to the often-quoted principles 21 and 22 is principle 25 which provides that: "States shall ensure that international organizations play a co-ordinated, efficient and dynamic role for the protection and improvement of the environment."[5]

The Action Plan for the Human Environment covers the "Identification and Control of Pollutants of Broad International Significance" in Recommendations 70 through 94.[6]

Recommendation 74 calls for development of international schedules, which would be kept up-to-date, of tests for evaluation of the environmental impact of potential or specific contaminants or products. Recommendation 85 calls for the development of an internationally accepted procedure for the identification of pollutants "of international significance and for the definition of degree and scope of international concern" and the quantitative assessment of the "exposures, risks, pathways and sources of pollutants of international significance".[7]

In 1972 these provisions raised expectations that international organizations, armed with scientific information on the extent of environmental damages, would assume jurisdiction to settle disputes and deal with situations that caused conflicts among

nations. Hindsight reveals that states have been willing to formulate general guidelines and goals while avoiding international machinery for enforcement.[8] In a broad-ranging discussion of the Stockholm Conference, a panel of international law experts did not mention procedures for settlement of disputes.[9] A lesson of the 70's for the 80's is that the Stockholm Declaration was an approach to effective environmental control which the world community could articulate but not implement. A task for the 80's is a revival of the high purpose of Stockholm and the identification of procedures for dealing with disputes and situations that do not, by requiring signature and ratifications, activate the self-protective instincts of sovereign states.

## International Environmental Law

International agencies have ruled on relatively few environmental disputes, thereby providing little case material for a study of this kind. The best example of an international adjudication dealing directly with a pollution problem is the Trail Smelter case,[10] in which trees, crops and other property in the State of Washington were damaged by sulphur dioxide fumes from a privately-owned zinc smelter in Trail, British Columbia. The tribunal which Canada and the United States established to arbitrate the dispute announced a principle, paraphrased in principle 21 of the Stockholm Declaration, that "no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequences and the injury is established by clear and convincing evidence."[11]

A second case which is often relied upon by environmentalists is the Lake Lanoux dispute between France and Spain.[12] France became involved in an electric generating project that resulted in rechanneling of water flow through the Carol river into Spain, though the amount of water for Spain was not diminished. Spain raised the issue of agreements which required prior consultation before such actions were taken. Holding that France was not prohibited by the agreement from doing what it did, the arbitral tribunal, in a statement that might be called obiter dictum, listed several different ways one might attack its conclusion that none of the guaranteed users of the waters had been damaged. As a first example it stated:

> It could have been argued that the works would bring about a definitive pollution of the waters of the Carol or that the returned waters would have a chemical composition or a temperature or some other characteristic which would injure Spanish interests. Spain could then have claimed her rights had been impaired in violation of the Additional Act. Neither the dossier[13] nor the debates of this case carry any trace of such allegation.

Although these two cases and others[14] illuminate the substantive law on pollution, they add nothing to the development of compulsory procedures for third party settlement. Both were arbitrated because the disputing states were willing to submit them to third party settlement. The Nuclear Test cases before the International Court of Justice are more instructive regarding the problems of procedural law related to environmental issues. Australia and New Zealand instituted proceedings on the basis of Optional Clause declarations against France to prevent nuclear tests in the Pacific and deposits of radioactive fallout on their territories.[15] In an interim order, the Court called upon France to avoid tests causing fallout on the territory of Australia and New Zealand. In its final judgment the court found that the claims no longer had any object because France had announced that those tests would be its last. France had rejected the jurisdiction of the Court throughout and had not participated in the proceedings. Furthermore, France terminated its declaration of acceptance of the Court's compulsory jurisdiction.[16] This case illustrates the lengths to which states may go to avoid third party settlement of environmental issues associated with their vital interests.

Conventional law,[17] especially that developed since the Stockholm Conference, has begun to add to the international obligations of states to protect the environment, but it demonstrates a much greater willingness on the part of states to subscribe to substantive rules than to accept obligations to submit to compulsory jurisdiction to resolve issues of their application. Development of substantive rules has been uneven among the various global problems; the law is ambiguous or non-existent for land-based sources of marine pollution, the conservation of high seas fisheries, marine mammals and climate modification activities.[18] Two observers have labeled efforts related to shared water resources a "mild setback" because they tended to emphasize cooperation on the basis of equality, sovereignty and the territorial integrity of states.[19] Adoption of new rules that then receive limited ratification sometimes makes progress more apparent than real.[20] The United Nations Law of the Sea conference, after years of effort, is only now putting into final form one of the most significant conventions containing elaborate machinery for dispute settlement.[21] All too often states make formal avowals of policies as a public relations ploy to please domestic and foreign groups that they do not intend to follow[22] and know they have not agreed to adjudicate in the event of violations. All too often the decision has been to leave enforcement to states, as in the case of the 1954 Convention on the Prevention of Pollution of the Sea by Oil (in force 1958), which left punishment to the state of registry, or to urge the opening of

national courts to foreign victims of pollution, where questions of denial of justice could arise.[23] Provisions in environmental conventions for resolution of disputes vary considerably. There are conventions, of course, that make no mention of dispute settlement, of which the treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water (Moscow, 1963; in force 1970)[24] is an example of crucial importance. Compliance is apparently to be assured by a balance of terror, for Article 4 provides that a party may withdraw unilaterally if it decides that extraordinary events have jeopardized the supreme interests of its country.

The more usual pattern is to mention consultations and various non-binding settlement procedures. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Washington, 1967; in force, 1967)[25] provides in Article 9 that a party may request consultation concerning the activity or experiment of another party if it has reason to believe such activity would cause potentially harmful interferences with its own activities. Article 11 of the Convention on the Dumping of Wastes at Sea (London, 1972; in force 1975)[26] avoids the issue of devising procedures for dispute settlement by calling upon the parties to consider such procedures at their first consultative meeting. Article 13 of the convention on Long-Range Transboundary Air Pollution (1979)[27] calls upon disputing parties to seek agreement through one of the traditional procedures for peaceful settlement. Article 25 of the Convention on the Conservation of Antarctic Marine Living Resources (Canberra, 1980; in force 1980) has a similar provision with the additional suggestion that, if this is not successful, the matter be submitted to the International Court of Justice if all parties agree.[28]

The United Nations Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (London-Moscow, 1972; in force 1975;[29] has the unusual provision (Article 6) that any party finding another violating the Convention "may lodge a complaint with the Security Council of the United Nations." It also reinforces the responding state's obligation to cooperate with the Security Council investigation. The result is compulsory process for bringing the violation before a third party with no power to make a legally binding decision unless that body finds a threat to the peace, breach of the peace or act of aggression.

Article 25 of the 1958 Geneva Convention on the High Seas (in force, 1962) calls upon states to take measures to prevent pollution of the seas by dumping of radioactive materials and to cooperate with international organizations to prevent pollution by radioactive materials or other harmful agents. The convention is accompanied by an

Optional Protocol of Signature Concerning the Compulsory Settlement of Disputes which provides in its fir[s]t Article:

> Disputes arising out of the interpretation or application of any convention on the Law of the Sea shall lie within the compulsory jurisdiction of the International Court of Justice, and may accordingly be brought before the Court by an application made by any Party to the dispute being a Party to th[is] Protocol.[30]

The optional clause device accompanying this or any other convention is severely restricted by state reluctance to make the necessary declarations. At the end of 1979 only nineteen states had accepted this Protocol; many were not major powers and China and France were the only adherents among the permanent members of the Security Council. This is less impressive than the record of acceptance of optional clause jurisdiction of the International Court of Justice.[31]

The 1958 Convention on Fishing and Conservation of the Living Resources of the High Seas (in force, 1966)[32] contains internal clauses for settlement of disputes and is not covered by the Optional Protocol. Several articles relate to steps states should take when problems arise because their nationals fish the same beds. Article 9 provides for submission to a special commission of five members (with alternate procedures for appointment if the parties cannot agree) and Article 11 provides that the "decisions of the special commission shall be binding on the states concerned." Regrettably this procedure applies to an aspect of environmental protection that is not as critical as some aspects of pollution.

Article 17 of the Convention on the Physical Protection of Nuclear Material (1979)[33] provides an example of compulsory processes related to a significant pollution hazard. Under its provisions any party to a dispute may refer it to the International Court of Justice or to arbitration with procedures to assure the appointment of arbiters in case the parties cannot agree.

Before leaving this sampling of the various dispute settlement clauses in conventions, some attention should be given to the latest efforts to deal with ocean pollution in the Third United Nations Conference on the Law of the Sea. The Conference met in resumed ninth session between July 28 and August 29, 1980 and produced another negotiating text that may be in almost final form. It is called "Draft Convention on the Law of the Sea (Informal Text)"[34] and is scheduled for final action in April, 1981. The machinery for dispute settlement does not appear to be currently at issue, but all parts of the convention can be discussed and amended. This new Law of the Sea convention may not be in force for some time because of the requirement of sixty adherences.[35]

Through the various drafts of the convention there has been an effort to transform a system of different dispute settlement procedures for separate Parts of the Convention into one system. There has been progress, but the procedures are still unusually complex and confusing, casting doubts on what matters are subject to settlement and what impact the references in the treaty to national sovereignty and jurisdiction or the clauses allowing reservations will finally have.[36] One writer has suggested that the complexity of the subject matter in the treaty and the polarized views prevalent in the international community on the question of compulsory procedures for settlement make agreement even more difficult than it was during the drafting of the 1958 conventions.[37]

Part V of the Draft Convention which deals with the Exclusive Economic Zone, places the coastal state in primary control, but Article 59 does provide that conflicts will be resolved on the basis of equity in cases where the Convention does not attribute rights or jurisdiction to the coastal state.

Part XI on the Area [38] contains an internal Section 6 on "Settlement of Disputes" and refers to the Sea-Bed Disputes Chamber of the International Tribunal for the Law of the Sea. Although this Chamber appears to have a considerable jurisdiction to settle disputes related to the Area, it should be noted that this refers to a relatively well-defined activity in the commons where national sovereignty never was preeminent.

Of most interest to those concerned with environmental pollution is Part XII on Protection and Preservation of the Marine Environment. This section begins (Article 192) with the reiteration of state obligations to protect and preserve the marine environment and follows immediately (Article 193) with a reaffirmation of the "sovereign right" of states to exploit their natural resources pursuant to "their environmental policies." States have an obligation (Article 194) to take all necessary measures to prevent pollution from a wide range of sources in the areas within their jurisdiction or control and they have been granted enforcement powers in Articles 213-222. Although this Part places some limitations on states,[39] it is primarily a vehicle for authorizing coastal states to regulate ocean pollution in that part of the ocean where the greatest problems of pollution arise. States are liable for loss or damage attributable to these actions only when such measures were unlawful or exceeded those reasonably required (Article 232).

Part XII on Protection and Preservation of the Marine Environment contains no internal articles regarding settlement of disputes and has no specific statement, as

does Part XIII on Marine Scientific Research on where such disputes will be settled.[39] Although the settlement of disputes machinery described in Part XV refers to settlement of any disputes (Article 279) relating to the interpretation of the Convention (presumably all parts of it), the inclusion of other procedures in some Parts obviously modified the scope of Part XV. The emphasis on state control of marine pollution in Part XII further restricts the obligation to submit to third party settlement. Nevertheless, Article 286 does provide for one-party submission of a dispute to binding settlement procedures, subject to an option for the parties to agree on a forum of their choice in Article 287, and Article 297 expressly includes disputes regarding protection and preservation of the marine environment among those to be submitted to settlement.[40] It should be emphasized, however, that the situation envisioned is one in which the coastal state is accorded considerable authority by the Draft Convention and procedures for settlement became compulsory only when the coastal state violates international rules in exercising this authority.

This survey of rules in force, rules adopted but not yet ratified, and draft rules indicates that procedures in treaty law for compulsory procedures for settlement of environmental disputes is likely to remain inadequate for years to come. The incidence of international environmental disputes between states is likely to increase as the world becomes more industralized and overpopulation strains available resources. Therefore it is useful to consider alternate means for resolution of these issues.

## Development of International Jurisdiction on the Basis of International Concern

The Westpbalian state system left states free to act unless they voluntarily consented to international regulation.[41] With the passing of time the scope of state discretion was reduced by new international conventions, but much was still within domestic jurisdiction prior to the establishment of the United Nations.[42] After the Second World War, states began to accept more readily the League of Nations principle that threats to international peace and security are the concern of the world community. The United Nations Charter takes the additional step of authorizing international actions to eradicate the underlying causes of war. This cleared the way for a substantial modification of the Westpbalian state concept, for many underlying causes of threats to and breaches of the peace arise in relation to matters traditionally regarded as within the domestic jurisdiction of states (which a state has no obligation to submit to settlement). The charter did not explictly transfer

specific underlying causes of war into international jurisdiction; it set the stage for transfers by implication.

In the absence of rules of international law that are generally accepted as sufficiently binding on the issues involved in a dispute or situation to remove them from domestic jurisdiction, the Security Council and General Assembly have commonly employed the alternate argument that international concern for the resultant grave repercussions remove them from domestic jurisdiction and defeat state pleas of domestic jurisdiction.[43] These are political organs of the United Nations, but they can interpret and apply international law.

The establishment of this doctrine of international concern began during Security Council debate on whether the Franco Regime in Spain was a threat to the peace, justifying enforcement action, or a mere situation the continuance of which was likely to endanger the maintenance of international peace, not justifying United Nations procedures for pacific settlement if the matter was domestic.

The Council could not hold that the situation in Spain was a threat to the peace, thereby overriding any conclusion that the nature of the government of Spain was a domestic question. It did accept the argument that if the facts indicate that a regime, by its nature, by its conduct, by its operations, is likely to interfere with international peace and likely to be a menace to its neighbors, then the regime is a "potential threat to the peace", ceases to be a matter of domestic concern and becomes one of international concern.[44] By a loose interpretation of the Charter, the Council had added potential threats to the peace as a new category in the continuum of gravity and immediacy between situations the continuance of which is likely to endanger the maintenance of international peace, on the one hand, and threats to the peace, breaches of the peace and acts of aggression, on the other.

Furthermore it had shifted the issue from international jurisdiction to international concern, reducing the rigor of proof of authority to act. The practical result was that United Nations organs could mobilize the pressures of world opinion on issues arising from matters generally regarded as domestic without having to declare them threats to the peace (with the possible attendant international obligation to go beyond peaceful procedures and employ collective security forces or other sanctions).

The elaboration of the doctrine of international concern continued when India brought the first racial discrimination case to the first session of the General Assembly. The arguments that international tensions created by discriminatory South African policies were so grave and caused such imminent threats to peace grew increas-

ingly passionate in succeeding sessions. Because few people believed, during the early sessions, that existing international documents on human rights and racial discrimination imposed sufficiently binding obligations on states to require their acquiescence to third party settlement, scant reliance was placed on these resolutions and declarations. The basis of United Nations jurisdiction was international concern about a potential threat to the peace.

When the Rhodesia/Zimbabwe case was brought to the United Nations, racial discrimination was assumed to have been placed under international jurisdiction by the development of new international law in the subject and the "emergency" jurisdiction authorized by international concern was de-emphasized. Assessments of the gravity and immediacy of the threat to peace caused by the Smith regime were advanced, not to justify international concern jurisdiction, but to justify the application of sanctions strong enough to bring about a change in the government in Salisbury.[45]

The exercise of international concern jurisdiction elicits pleas of domestic jurisdiction based on concepts of the Westphalian state system. Assessments of the motivations of states voting for the assumption of international jurisdiction reveal more political motivations than cool evaluations of the gravity and immediacy of potential threats to peace. Nevertheless, this has proved to be a viable avenue for international action that can be used and improved upon in environmental situations.

## The Concept of Jurisdiction Based on International Concern for the Environment

The international concern jurisdiction described in the previous section can be invoked by United Nations political organs when an environmental dispute raises such tensions among states that it constitutes a potential threat to the peace. That such environmental issues can not only cause grave tensions but also lead to breaches of the peace needs no scholarly justification.[46] The proposed international environmental concern jurisdiction can supplement the doctrine on international concern when international tensions are mild and can provide a basis for jurisdiction in all environmental disputes that will be less susceptible to the charge that it was politically motivated.[47]

The Stockholm Conference demonstrated international concern for the environment. During the 1970's considerable progress has been made in developing substantive rules with varying degrees of binding force to instruct the international community as it deals with the environment.[48] It should perhaps be noted that international concern for the environment is here an impetus for state action, not an authorization. In

the Westphalian state system states clearly have jurisdiction to join together in making international environmental rules. We are here concerned with authorizing an international agency to intervene in a dispute between states on the basis of the international concern when the matter being disputed is a potential threat to the environment. Aside from a few scattered conventions and the machinery described in the draft Law of the Sea Convention, the settlement of disputes depends upon the willingness of the parties. Furthermore, the effort to coordinate the multitude of international agencies under the United Nations Environment Program (UNEP) and thereby improve efforts at implementation has been described as a roof that is best visualized as "a jungle of gables and turrets of unequal height which has a tendency to leak."[49]

The concern of the international community for the survival of the planet earth does not mean that governments are any less reluctant to submit issues which they have traditionally regarded within the domestic jurisdiction of a sovereign state to compulsory third party settlement.[50] Therefore the rationale for a jurisdiction for third party participation in these issues that does not have to await the adoption and widespread ratification of an international convention providing for compulsory third party settlement is needed. This remedy is offered in the spirit of the following statement by Myres S. McDougal and Jan Schneider: "Given the urgency of present ecological imperatives, flexible approaches to application on the part of those most directly concerned are required until the world constitutive process develops its own adequate means of application."[51]

To some extent the international environmental concern described in this paper is undergirded by conventional and customary international law. Its fundamental basis is the statements of international concern for peace and the authorization for international agencies to deal with a broad range of matters which may be the underlying causes of war in the League of Nations Covenant and the United Nations Charter. Nevertheless, it is finally justified as an "emergency" jurisdiction to resolve critical problems when existing law contains insufficient provisions for "routine" action. When the Stockholm Declaration is grafted onto this framework, the result is a constitutional understanding (partly implied, partly expressed) that agencies of the international community may take steps to preserve the environment because the vital concern of the international community overrides the sovereign immunity of a single state from third party intervention.

The utilization of science and technology to determine whether or not there is genuine international environmental concern is not without problems. The responsible sources of some environmental pollutants are easily established; the sources of others are dispersed or only partially known. The domestic waste that gets into territorial waters may not cause a direct international damage, but it may contaminate the spawning beds of sea life and thus reduce world food supplies. The clear and immediate threats to the environment and to human health of some pollutants are well established; others are dangerous only after long-term cumulative effects; some are not yet sufficiently measured for their impact to be ascertained. Some pollutants are little more than a temporary nuisance; others may damage the environment for centuries.[52]

There remain doubts as to the possibility or advisability of consulting scientists when these international disputes arise. One study found no evidence that "expert knowledge is affecting political action."[53] It found instead a widespread lack of faith among scientists in the special role of science and was pessimistic regarding the influence that science could have in forming non-ideological policies for international agencies.[54]

On the other hand Harlan Cleveland has stated: "As soon as it seems that the problem will yield to the application of someone else's scientific discovery or technical innovation, it quite suddenly seems outrageous not to apply the new knowledge."[55] Another writer has stated: "It is part of conventional wisdom that environmental matters generally raise issues of a scientific and technical nature. The desirability of bringing technical expertise to bear in their solution is, therefore self-evident."[56]

There are, of course, conflicting scientific findings on the same problem to confuse the non-scientists in an international agency, but none of them could be so

blatantly self-serving as the conflicting views expressed on the gravity of non-environmental issues such as an East-West conflict, a colonial issue or charges of racial discrimination associated with the early development of the concept of international concern. On balance, it would seem that international agencies will use scientific knowledge, just as they use non-scientific data, in arriving at decisions. The crucial issue is that the political and legal agencies make use of the scientific knowledge without being controlled by it. Furthermore, although most scientists have not yet thought of their work in terms of specific international policies or bases for resolution of international disputes, they are in the process of collecting the data that international agencies can use for these purposes.[57]

## Classification of Threats to the Environment

A classification of the various threats to the environment which assesses on the basis of scientific evidence the degree of damage involved in each will facilitate the work of decision-makers faced with the determination of their jurisdiction to intervene as a third party in a dispute. Although it is commonplace to link scientific data and environmental problems, critical inquiries into the relationship between science and policy have been scarce.[58] During an early discussion of environmental legal problems, an observer noted the absence of scientists and proposed that these problems required that lawyers and scientists talk about them.[59] This convergence of disciplines is still rare, but scientists have made some progress in making classifications.[60] Many journals are now devoted to environmental questions[61] and the Boston College Environmental Affairs Law Review (formerly Environmental Affairs) makes the bridge between law and science, but regrettably for our purposes it concerns itself primarily with national and local issues. Furthermore, progress is being made in such programs as the United Nations Environmental Program's Earthwatch and Global Environmental Monitoring System (GEMS). If fully developed, the latter would provide the framework for integrating results of many monitoring systems.[62] The effort has not been well-balanced, for more progress had been made in connection with sea pollution than in other areas.[63]

Efforts have been underway for some time to classify and rank according to seriousness the various pollutants. These initial efforts are relatively general in approach, but they are adaptable for use in deciding jurisdiction on the basis of a potential threat to the environment. In fact, a taxonomy is not needed to determine jurisdiction within itself. What is needed is a body of scientific information organized to facilitate access and written in language that is comprehensible to non-

scientists. As a political scientist, I do not propose here to describe the final classificatory system, but to review some of the efforts of scientists in this area.

Some efforts at classification have dealt with the locus of damage, such as oceans, airspace, outer space and land, while a similar effort deals with the source of the pollutant, such as tankers at sea, municipal and industrial wastes, wastes discharged from coasts, weather modification. More common, and perhaps more useful in determining international jurisdiction, are the classifications which make a listing of all pollutants the primary basis for organizing information, such as oil, radioactive materials, heavy metals, solid wastes. Finally, some classification schemes are limited to the locus of damage (for example, the ocean) and proceed to examine each pollutant that affects that place. The most useful efforts are in this final category.

A division among land, sea, air and outer space leads to measurements of how far a pollutant introduced at one place will travel to damage others. Certainly this factor must be considered in any efforts to establish an international environmental concern jurisdiction, for the pollutant must travel across international frontiers and inflict a serious damage to persons or their property in another state in order to create an international dispute.[64] Obviously, pollution that occurs on land is least apt to damage another state. One could take the expansive view that "only the largest nations can pretend that even the most local pollution is local,"[65] that streams run down to the open sea and that pesticides used on land enter an atmosphere that is a global system. We also know that mild pollutants that accumulate and affect food chains and life cycles of sea life may eventually cause more harm than the fallout of one nuclear explosion. But this expansiveness is kept within reasonable bounds when we add the test of the seriousness of the damage.

Because the oceans cover 3/4 of the planet and much of that surface is regarded as the common heritage, the restrictions that state sovereignty places on international jurisdiction are diminished. The same principle applies to the Polar regions and Outer Space. In the efforts to provide rules relative to the ocean, the area most susceptible at this time to international tensions, there has been a tendency to reduce the scope of this international jurisdiction by conferring jurisdiction on the coastal state.

Approaches to air pollution usually separate radioactive pollution and non-radioactive pollution. As is well known, test bans have caused a reduction in radioactive pollution. Current concern is with pollution from industrial uses of nuclear power. Non-radioactive pollutants are now somewhat regional and concentrated in

industrial areas. Even in these smaller areas, it is difficult to show a direct cause and effect relationship. We do not have the technology to trace the acid rain in Norway and Sweden to a specific culprit in Western Europe. When we attempt to place responsibility for levels of carbon monoxide, pesticides, or some other pollulant in the global atmosphere, the problem becomes even less manageable.[66]

Aside from the light that these spatial divisions throw on the probability that a pollutant will cross frontiers and cause serious damage, such approaches are more useful in providing a basis for making new international policies to reduce or control pollution than in providing a rationale for international jurisdiction to settle disputes.[67]

The 1970 MIT study identified the following pollutants as worthy of special attention: carbon dioxide, particulate matter, sulfur dioxide, oxides of nitrogen, mercury and other toxic heavy metals, oil, DDT and other hydrocarbons, radionuclides, heat and nutrients (especially phosphate).[68] Other pollutants might cause local damage, but the list was limited to those which were global. This basic list has been lengthened by those who would include the amenities (cluttering of beaches with plastic bottles and other solid wastes) and pollution of a local scope in the taxonomy or who have subdivided and rearranged categories.[69] Furthermore, they have added the assessment, by category, of the relative dangers of each pollutant,[70] with particular attention to "ultrahazardous" or "abnormally dangerous" activity.[71]

Handl suggests that in the absence of a priori determination by agreement that an activity is hazardous, establishment of this characteristic may entail some difficulties.[72] Nevertheless, a determination in United Nations agencies to establish a potential threat to the environment is less difficult than finding a potential threat to the peace because of the more objective data available to assess the former.

The weight given to each pollutant was not determined alone by its abstract toxicity. A typical scale for assessing potential pollutants included (1) rate of release into the environment, (2) life time in the environment, (3) concentration factors in parts of the system, and (4) levels of toxicity.[73] With these criteria the disposal of highly toxic substances with long lives engenders most intense international concern,[74] but the international community should not overlook large accumulations of less toxic substances that threaten food chains and life cycles simply because they are less "glamorous."

As noted earlier, much classification has related to ocean pollution and it is here that the most precise scales for measurement have been proposed.

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An early attempt at classification of marine pollutants appeared in a Report of the Secretary-General to the Economic and Social Council in 1971. The Report listed and assessed (1) halozenated hydrocarbons, (2) petroleum and its derivatives, (3) other organic chemicals, (4) inorganic chemicals, (5) nutrients, (6) suspended solids, (7) radioactive materials, and (8) thermal waste.[75]

Another pioneering effort can be found in the work of Robert A. Shinn who classified ocean pollutants as (1) domestic sewage, (2) pesticides, (3) inorganic wastes, (4) radioactive materials, (5) oil and oil dispersants, (6) petro-chemicals and organic chemicals, (7) organic wastes including pulp and paper wastes, (8) military wastes, (9) heat, (10) detergents, (11) solid objects, and (12) dredging spoil and inert wastes.[76] In the appraisal of these items, Shinn attempted to describe a scale of clear and present dangers that was sufficiently broad and flexible to be adapted to each dispute on the basis of additional scientific information available at that time. This approach could be followed by decision makers as well as by scientists.

The classification that is most specific and yet most comprehensive in approach is that of E. B. Crowell. He begins by describing a six-point scale of pollution ranging from very minor aesthic damage to catastrophic or disastrous pollution. Then relying on a wide range of authorities who have evaluated specific pollutants, he placed thirty pollutants (or polluting actions) on this scale from 1 through 6. Polythene bottles were ranked 1 minus and world population explosion 6 plus.[77] The Crowell scale of pollution and table of thirty pollutants follow:

1. Environment addition
   (a) Aesthetic damage: View spoilt or place rendered unsightly, but no detectable biological damage. For example, polythene bottles.
   (b) Possible threat: Substance detectable and shown to be a potential biological danger experimentally. Level below that at which biological change can be detected.

2. Environmental contaminant: Some biological change detectable but not considered to be serious.

3. Environmental hazard: Organisms at risk. Effect causes concern among ecologists and is sufficient to warrant action to reduce the level in the environment.

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4. Environmental pollutant: Organisms die and the level of pollution is high enough to merit public concern. The Species Diversity Index of the area is reduced with consequent loss of ecosystem stability.

   (a) Chronic pollutant: Continued low levels result in progressive damage at a rate higher than that of recovery processes. Situation will deteriorate unless measures to improve the situation are taken. For example, industrial effluents.
   (b) Acute pollutant: Damage may be sudden and serious but recovery will usually take place naturally. Usually found as a consequence of isolated incidents. For example, localised oil pollution.

5. Dangerous pollution: Official action is automatic.

   (a) Biological damage: Severe, but recovery is possible if action is swift and effective. Mortality will be high, with species threatened over a wide area.
   (b) Radio-activity: Mortality may be low initially but species endangered as a result of genetic damage. For example, radiation level more than 0.5 rad year.

6. Catastrophic or disastrous pollution: Widespread heaby mortality with little or no hope of rapid recovery. Species may be eliminated locally or even nationally. For example, the aftermath of nuclear, chemical, or biological warfare.

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RELATIVE POSITIONS OF COMMON POLLUTANTS ON SCALE PROPOSED BY COWELL (1970)

(Arrows indicate weighting towards higher or lower categories)

| | Pollution source | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| 1 | Polythene bottles | ← | x | | | | |
| 2 | 98 % Milford Haven oil pollution spillages | | x | | | | |
| 3 | Enzymes from detergents | - | x | | | | |
| 4 | Oil pollution from tankers operating LOT + | | x | | | | |
| 5 | Dumping of American nerve gas | | x | - | | | |
| 6 | Detergent burden in London drinking water | | x | - | | | |
| 7 | Methyl mercury in UK | | | -x | | | |
| 8 | Hot water from power and industrial plant | | | -x | | | |
| 9 | Oil pollution from refinery effluents | | | -x | | | |
| 10 | Oil from tankers not operating LOT + | | | x | | | |
| 11 | Present level of disposal of radio-active waste | | | x | | | |
| 12 | Tourist damage to the Pembrokeshire coast | | | x | | | |
| 13 | Agricultural fertilisers in British rivers | | | x | | | |
| 14 | Tourist damage to the Cornish coast | | | x | - | | |
| 15 | Organic effluents in the Thames | | | x | - | | |
| 16 | Suspended sediments from Durham coast | | | | - x | | |
| 17 | Chlorinated hydrocarbons in the Atlantic | | | | - x | | |
| 18 | Oil from Chryssi P. Goulandris accident 1967 | | | | - x | | |
| 19 | Chlorinated hydrocarbons in UK and Europe | | | | x | | |
| 20 | Polychlorinated biphenyls in Atlantic | | | | x | | |
| 21 | Sewage disposal in North Estuary | | | | x | - | |
| 22 | Chlorinated hydrocarbons in USA | | | | x | - | |
| 23 | Oil from the Torrey Canyon accident | | | | x | - | |
| 24 | Detergents used in cleaning Chryssi P Goulandris oil | | | | x | - | |
| 25 | Methyl mercury in the Baltic | | | | | -x | |
| 26 | Methyl mercury in Lake Erie, USA | | | | | x | - |
| 27 | Detergents used after Torrey Canyon | | | | | | - x |
| 28 | Methyl mercury, Minimata and Agano Rivers Japan | | | | | | x |
| 29 | Hiroshima and Nagasaki atomic explosions | | | | | | -x |
| 30 | World population explosion | | | | | | x - |

+ Load on top system for disposing of oily wastes at sea.

One advantage of the Crowell approach for those making decisions on potential threats to the environment is its inclusion of the widest possible range of pollutants. It does not present a scientist's conclusion, as does the MIT classification described earlier, that certain pollutants are not global and need not be considered. The MIT approach pre-empts the international agency's decision-making powers by foreclosing certain possibilities. It is not for the scientist to make that decision. The international agency must be prepared to assess any pollutant for which a state might be held liable. By definition that includes substances which result in harm to living resources, hazards to human health, hindrances to activities such as fishing and farming, impairment of the quality of sea, water or air, and reduction of amenities.[78]

The Crowell scheme also has the advantage of presenting in a very concise form the scientific evidence regarding the dangers of each kind of pollutant. It thus serves as an excellent starting point for decision-makers who must then go more deeply into the scientific evidence surrounding each case.

## Summary and Conclusions

The conflict between a new realization that some environmental problems must be resolved in common actions through international organizations and the traditional reluctance to diminish the scope of sovereign control by providing the machinery for global action has influenced all efforts to deal with environmental issues from the Stockholm Conference to current efforts in the Third United Nations Conference on the Law of the Sea. There is no reason to assume that the immediate future will reveal a trend toward reducing state discretion by establishing formal procedures for compulsory settlement of international disputes. On the contrary, the considerable anxiety generated by pessimistic forecasts of global environmental calamity unless the world community resorts to concerted action has diminished with the appearance of recent more moderate appraisals of the environment and suspected pollutants.[79] At the same time, the tensions caused between Mexico and the United States when the Ixtoc-I deep-sea oil well spewed barrels of crude oil into the Gulf of Mexico and onto Texas beaches illustrate all too well that environmental disputes still arise between states and that the offending party can forestall settlement.

As one observer has described the situation, we "have failed to show sufficient initiative, imagination, and activism in the development of both mechanisms and principles for international environmental dispute settlement."[80] The situation calls for an alternative means for resolving these issues. The adaptation of the established

doctrine of international concern as a justification for international organization jurisdiction regarding potential threats to the peace in order to establish a doctrine of international environmental concern as a justification for those same international bodies to assume jurisdiction over environmental disputes is such an alternative.

A doctrine of international environmental concern would be less susceptible than the doctrine of international concern to charges by states resisting international jurisdiction that it was based on votes of international actors that were politically and subjectively motivated. Whereas there has been evidence of cynicism when states saw potential threats to peace in the policies of opponents without being able to see them when allies followed similar policies, the finding of a potential threat to the environment can be based on objective scientific evidence.

The finding of a potential threat to the environment will be restricted by the level of our knowledge. Two observers have said that "we are profoundly ignorant of much that goes on in the marine environment,"[81] and that assessment may not be too extreme to be used to describe our knowledge of much of the non-marine world. Nevertheless we are building on that knowledge and have a fair chance of building a satisfactory scientific basis for decision-making before we enact a satisfactory international structure for compulsory settlement of environmental disputes.

State acceptance of international environmental concern jurisdiction will be enhanced if decision-makers resist the temptation to apply it to all issues that arise. Many current issues have an environmental dimension. The word "environment " may be interpreted to include the entire relationship between man and his surroundings.[82] Using scientific evidence, the decision-makers must distinguish genuine threats, whether immediate or cumulative, to an area that includes two or more states from those which cause local or minor damage only or international tensions that could never be reasonably regarded as threatening peace.

It would be reasonable to try to reserve international environmental concern jurisdiction to pollution problems and to resist including such issues as human settlements issues or concern with over-population. Such a narrowing of scope would be tested by those who would want to take advantage of any viable machinery for dispute settlement.

It would also be reasonable to try to reserve jurisdiction to pollution problems that are truly global, leaving other issues to be resolved on a regional or bilateral basis,[83] but total success is unlikely because all acts of environmental pollution start at one point and the fact that local reaction comes first does not preclude on international impact. There is evidence that states have, in international confer-

ences and in unilateral actions, begun to move toward opening national courts for the resolution of some of these issues,[84] but it should be remembered that international jurisdiction can begin when local remedies have been exhausted and there has been a denial of justice.

It is also obvious that the division between international and national jurisdiction will be influenced by whether pollution occurs in the oceans, in the air or on the land of a sovereign state. Pollution in the oceans or the air may more quickly affect another state than would land pollution. Furthermore, distinctions between the commons and sovereign rights may arise. International jurisdiction is much more easily claimed in the commons where no state can claim exclusive control. It would be unlikely that most decision-makers could be convinced that a nation's exploitation of its natural resources has ramification across frontiers sufficient to engage international concern jurisdiction or that excessive noise is anything more than a local problem (unless it is transmitted electronically over air waves).

Finally, it should be noted that compulsory jurisdiction to settle environmental disputes that has been established by conventional law adhered to by most states would always be preferable to that based on "emergency" or implied powers. Nothing in this proposal for a doctrine of international environment concern jurisdiction should be taken as a suggestion that efforts to provide a more formal basis for jurisdiction should be reduced.

FOOTNOTES

[1]UN Doc, A/Conf/48/14/Rev. 1, 5-16 June 1972, p.4.

[2]Charles S. Pearson, "International Marine Environmental Policy: The Economic Dimension," Studies in International Affairs, Number 25 (Baltimore: The Johns Hopkins University Press, 1925), p. 45.

[3]UN Doc. A/Conf/48/14/Rev. 1, 5-16 June 1972, p. 5.

[4]Ibid.

[5]Ibid.

[6]Ibid., pp. 20-24.

[7]Ibid., pp. 21-22. Recommendations 88 and 89 (pp. 22-23) extend this to chemicals and an evaluation of the toxicity of potential marine pollutants. For a systematic commentary of the Principles and Recommendations, see Louis B. Sohn, "The Stockholm Declaration on the Human Environment," Harvard International Law Journal, 14 (Summer 1973) 3: 423-515.

[8]See Robert A. Shinn, The International Politics of Marine Pollution Control (New York: Praeger Publishers, 1974), pp. 138-139; George F. Kennan, "To Prevent a World Wasteland," Foreign Affairs, 48 (1970): 403-405.

[9]"Post-Stockholm: Influencing Environmental Law and Practice Through International Law and Policy, Proceedings of the American Society of International Law 1972 (cited hereinafter as Proc. ASIL), pp. 1-14.

[10]American Journal of International Law, (cited hereinafter as AJIL), 33 (1932): 182 and 35 (1941): 684. For a discussion of this case and some of the others mentioned in this section, see L.F.E. Goldie, "Development of International Environmental Law--An Appraisal," in John Lawrence Hargrove (ed.), Law, Institutions, and the Global Environment (Dobbs Ferry: Oceana publications, 1972), pp. 131-133 and Frederic L. Kirgis, Jr., "Technological Challenge to the Shared Environment: United States Practice," AJIL, 66 (April 1972): 291-294.

[11]AJIL, 35 (1941): 684.

[12]AJIL, 53 (1959): 156-171.

[13]Ibid., pp. 160-161. For a general analysis of this case, see John G. Laylin and Rinaldo L. Bianchi, "The Role of Adjudication in International River Disputes: The Lake Lanoux Case," AJIL, 53(1959): 30-49.

[14]See for example, an account of the Gut Dam arbitration between Canada and the United States in Jan Schneider, World Public Order of the Environment: Towards an International Ecological Law and Order (Toronto: University of Toronto Press, 1979), pp. 50, 165-166.

[15]1973 I.C.J. 99, 106, 135, 142; 1974 I.C.J. 253.

[16]Multilateral Treaties in Respect to which the Secretary-General Performs Depositary Functions as of 31 December 1974., p. 10 note.

[17]For some of the assessments of international environmental law (including customary rules) see, Ian Brownlie, "A Survey of International Customary Rules of Environmental Protection," Natural Resources Journal 13 (April 1973) 2: 179-189; Ludwik A. Teclaff, "The Impact of Environmental Concern in the Development of International Law," in Ludwik A. Teclaff and Albert E. Utton (eds.) International Environment Law (New York: Praeger Publishers, 1974), pp. 229-259; Gerald Moore, "Legal Aspects of Marine Pollution Control," in R. Johnston, Marine Pollution (New York: Academic Press, 1976), pp. 594-629; Allan K. McKnight, Pauline K. Marstrand, and T. Craig Sinclair, Environmental Pollution Control: Technical, Economic and Legal Aspects (London: George Allen & Unwin, Ltd., 1974). Environmental Protection in Frontier Regions, op. cit.

[18]Jan Schneider, op. cit., p. 128. Land-based pollution of inland rivers has been regarded within domestic jurisdiction although it may eventually reach the oceans. See Thomas A. Menah, "The Law Relating to the Pollution of the Seas," in McKnight, Marstrand and Sinclair, op. cit., pp. 194-195; Boleslaw A Boczeck, "International Protection of the Paltic Sea Environment Against Pollution: A Study in Marine Reginalism," AJIL, 72 (1978): 810-811. On the protection of living organisms in the sea, the tendency has been to leave the establishment of conservation zones to coastal states which may be as concerned with their share of the fish catches as with protection of that resource. See Robert E. Stein and John L. Hargrove, "International Environmental Protection: Policy and Legal Aspects," Proc. ASIL, 1977, p. 51.

[19]Stein and Hargrove, op. cit, p. 53.

[20]For earlier assessments of progress toward ratification, see Jan Schneider, op. cit, pp. 83-84, 129; Patricia W. Birnie, op. cit., pp. 98-104.

[21]For the most recent draft, see International Legal Materials (hereinafter cited as ILM), 19 (September 1980) 5: 1129-1295.

[22]M'Gonigle and Zacher, op. cit., p. 327.

[23]For elaboration of this point, see Stein and Hargrove, op. cit., p. 53; Stephen C. McCaffrey, "Pollution of Shared Natural Resources: Legal and Trade Implications," Proc. ASIL, 1971, p. 56. The latter has noted that a number of international bodies, as well as international agreements, have taken the position that transnational pollution problems, to the extent possible, should be handled in domestic courts.

[24]Treaties and Other International Acts Series (cited hereinafter as TIAS), no. 5433.

[25]AJIL, 61 (1967): 644-649. The more recent United Nations Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) provides that a party "may seek assistance of the Secretary-General, without seeking the consent of the other party concerned, in order to resolve the controversy" (Article 15) if consultation fails, but provides no further step. ILM, 18 (1979): 1440.

[26]ILM, 11 (1972): 1302.

[27]ILM, 18 (1979): 1448.

[28]ILM, 19 (1980): 855. The earlier Antarctic Treaty (in force 1961) has an almost identical clause. TIAS 4780.

[29]ILM, 10 (1971): 1177.

[30]AJIL, 52 (1958): 848-849, 862.

[31]Multilateral Treaties in Respect to Which the Secretary-General Performs Depositary Functions, 1979. In 1970 Canada declared a 100-mile anti-pollution zone which would be controlled from national jurisdiction and amended its declaration of acceptance of the optional clause jurisdiction of the InternationalCourt of Justice to exclude issues arising out of its anti-pollution measures. The new declaration is reprinted in ILM, 9 (1970): 598. See also Louis Henkin, "Arctic Anti-Pollution: Does Canada Make - - or Break - - International Law," AJIL, 65 (1971): 131-136, John King Gamble, Jr., has pointed out that 12 percent of the reservations to all multilateral treaties deal with compulsory settlement of disputes and uses the Law of the Sea Convention as illustration for the argument why settlement procedures are needed and why they inspire reservations. "Reservations to Multilateral Treaties: A Macroscopic View of State Practice," AJIL, 74 (1980): 387.

[32]AJIL, 52 (1958): 851-858.

[33]ILM, 18 (1979): 1429.

[34]ILM, 19 (1980): 1129-1295. The following references to Parts and Articles of the Draft Convention are from this source unless otherwise noted.

[35]One observer has projected the late 1980's or early 1990's. New York Times, October 19, 1980, p. 3. For analyses of previous drafts of this convention see A.O. Adede, "Settlement of Disputes Arising Under the Law of the Sea Convention," AJIL, 69 (1975): 798-818; Adede, "Law of the Sea: The Scope of the Third-Party, Compulsory Procedures for Settlement of Disputes," AJIL, 71 (1977): 305-311; Adede, "Law of the Sea - - The Integration of the System of Settlement of Disputes Under the Draft Convention as A Whole," AJIL, 72(1978): 84-95; Bernard H. Oxman, "The Third United Nations Conference on the Law of the Sea: The 1977 New York Session," AJIL, 72 (1978): 58-83; Oxman, "The Third United Nations Conference on the Law of the Sea: The Seventh Session (1978)," AJIL, 73 (1979): 1-41; Louis B. Sohn, "U. S. Policy toward the Settlement of Law of the Sea Disputes," Virginia Journal of International Law, 17 (1976): 9-21; John R. Stevenson and Bernard H. Oxman, "The Third United Nations Conference on the Law of the Sea: The 1974 Caracas Session," AJIL, 69 (1975): 1-30; Shabtai Rosenne, "Settlement of Disputes in the Economic Zone," AJIL, 73 (1979): 89-104.

[36]See, for example, the comment of Oxman, "The Third United Nations Conference on the Law of the Sea: The Seventh Session (1978)," op. cit., p. 7; Schneider, op. cit., pp. 183, 270-271.

[37]Rosenne, op. cit., pp. 89-90.

[38]The Area is defined in Part I, Article 1 as the "sea-bed and ocean floor and subsoil thereof beyond the limits of national jurisdiction."

[39]Article 264 of Part XIII provides: "Disputes relating to the interpretation or application of the provisions of this convention with regard to marine scientific research shall be settled in accordance with section 3 of Part XV." Furthermore, Part XV has Article 285 which refers to the application of its general settlement of disputes procedures to Part XI on the Area, but has no comparable article on their application to marine pollution issues arising under Part XII.

[40]The relevant provisions of Article 297 follow: "1. Dispute relating to the interpretation or application of this Convention with regard to the exercise by a coastal State of its sovereign rights or jurisdiction provided for in this Convention, shall be subject to the procedures specified in section 2 in the following cases: . . . "(c) When it is alleged that a coastal State has acted in contravention of specified international rules and standards for the protection and preservation of the marine environment which are applicable to the coastal State and which have been established by this Convention or by a competent international organization or diplomatic conference acting in accordance with this Convention."

[41]For a good description of the Westphalian state system, see Eric Lane, "Demanding Human Rights: A change in the World Legal Order," 6 Hofstra Law Review (Winter 1978): 269-295.

[42]J. L. Brierly / Law of Nations (Oxford at the Clarendon Press, 1930): 53-54 / listed as domestic (1) foreign economic and financial policies, (2) migrations, (3) treatment of nationals, (4) determination of internal political, economic and social life, and nationality laws.

[43]For further description of the doctrine of international concern, see John M. Howell, "Domestic Questions in International Law," Proc. ASIL, 1954, pp. 90-99, and sources cited therein.

[44]SCOR, First year: First Series (1946), No. 2, 181, 195, 315, 344-345, 353-354.

[45]For fuller discussion, see John M. Howell, "The Implications of the Rhodesian and Congo Crises for the Concept of Domestic Jurisdiction," Australian Journal of Politics and History 14(1968): 358-372 and "A matter of International concern," AJIL, 63(1969): 771-782

[46]David R. Deener stated that it is problematical that any nation would make a war or peace issue out of a matter of environmental quality, but he cited the Canadian Arctic Waters Pollution Act as evidence that it was not problematical that nations would take environmental problems very seriously and be prepared to take unusual and dramatic steps. "Torts in Violation of International Law," International Law Papers (New Orleans: Ponchartrain Press, 1973), p. 117.

[47]For rankings of environmental problems on the basis of personal and national attitudes, see Russell Weigel and Joan Weigel, "Environmental Concern: The Development of a Measure," Environment and Behavior, 10 (1978) 1:3. See also Frederick H. Buttel and William L. Flinn, "The Politics of Environment Concern: The Impacts of Party Identification and Political Ideology on Environmental Attitudes," Environment and Behavior, 10 (1978) 1: 17-36. The proposal of this paper is that less subjective bases be used.

[48]One writer suggests that the "impact of environmental concern on the international community and on international law has already been considerable; and there are indications that, as time goes on, that impact will rapidly increase," but finds a "relative primitiveness. . . in the stage of evolution of machinery to protect it." Ludwik A. Teclaff, "The Impact of Environmental Concern on the Development of International Law," Natural Resources Journal, 13 (April 1973) 2: 389. Another writer wrote that "transfrontier pollution will remain a fruitful source of wrongs without remedies as long as governments fail to combat it effectively through concerted

action." S. C. McCaffrey, "Private Remedies for Transfrontier Pollution Injuries," in Jolanta Norwak, Environmental Law: International and Comparative Aspects: A Symposium (N.Y.: Oceana Publications, 1976), p. 22.

[49]Ernst B. Haas, Mary Pat Williams, and Don Babai, Scientists and World Order: The uses of Technical Knowledge in International Organizations (Berkeley: University of California Press, 1977) p. 200.

[50]See Nagli Choucri, "Population, Resources, and Technology: Political Implications of the Environmental Crisis," International Organization 26 (Spring 1972): 175-176. On the other hand is the suggestion that since the global environmental crisis "governments have begun to perceive the imperative of a less statecentered perspective in the prescription of international environmental law:" "New perspectives on International Environmental Law," Yale Law Journal, 82(1973): 1659-1680. There may be such perceptions and there are general statements about the unity of the biosphere, the universality of man's heritage, and man's obligations as custodian of the Earth; but these are not yet imperatives that undergird machinery for settling disputes. For this approach, see Lynton K. Caldwell, "Concepts in Development of International Environmental Policies, "Natural Resources Journal 13 (April 1973) 2: 190-202.

[51]"The Protection of the Environment and World Public Order: Some Recent Developments," Mississippi Law Journal, 45 (November 1974): 1113.

[52]For an attempt to classify these differences see Shinn, op. cit., pp. 1-47.

[53]Haas, Williams, and Babai, op. cit., p. 12.

[54]Ibid., p. 353. For corroboration of this view, see Craig Sinclair, "The Future," in McKnight, Marstrand and Sinclair, op. cit., p. 313.

[55]"The Internationalization of Domestic Affairs," The Annals of the American Academy of Political and Social Science, No. 442 (March 1979): 131-132.

[56]Aida Luisa Levin, "Protecting the Human Environment: Procedures and Principles for Preventing and Resolving International Controversies," A Unitar Study (New York: Unitar, 1977), p. 15. See also Zdenek J. Slouka, "International Environmental Controls in the Scientific Age," in John Lawrence Hargrove (ed.), Law, Institutions and the Global Environment (Dobbs Ferry, Oceana Publications, Inc., 1972), pp. 208-236.

[57]See Robert E. Stein's comments during a panel on "Can the U.N. Lead the Environmental Parade?" AJIL, 64(September 1970) 4:226. He also noted that the Trail Smelter tribunal obviously relied heavily on technical experts in reaching its decision. Lynton K. Caldwell has concluded that earlier attempts at international environmental cooperation were shaped more by legal than ecological considerations. In the earlier treaties, arbitrations and adjudications involving environmental-related disputes, established principles of international law were extended to environment-related issues rather than legal concepts being modified or enlarged by environmental concepts. "Concepts in Development of International Environmental Policies, "op. cit., p. 190.

[58]Zdenek J. Slouka, op. cit., 208; Moore, op. cit., p. 591.

[59]Nicholas A. Robinson, Proc. ASIL, 1970, in AJIL, 64(1970): 236.

[60]A pre-Stockholm attempt to assess, item-by-item, the effects of various pollutants was published as Man's Impact on the Global Environment: Assessment and Recommendation for Action (Cambridge: MIT Press, 1970).

[61]Pollution Abstracts and Air Quality Abstracts have been published since 1970. Assessing Potential Ocean Pollutants is a 1975 report of the National Academy of Sciences. See also Wilfred Gallay et.al., in Environmental Pollutants: Selected Analytical Methods, Scientific committee on Problems of the Environment (Ann Arbor: Science Publishers, 1975) and Winona B. Vernberg et al., Marine Pollution: Functional Responses (New York: Academic Press, 1979).

[62]For a fuller description of this system, see Jan Schneider, op. cit., pp. 75-83; UNEP/GC/31/Add. 2, 25 February 1975; "An International Register of Potentially Toxic Chemicals: Components and Network," UNEP/WG. 1/3, December 1974; Harlan Cleveland, op.cit, p. 131.

[63]E. B. Crowell (ed.), Ecological Effects of Oil Pollution in Littoral Communities (Apple Road, England: Applied Sciences publishers, Ltd., 1971); Pauline K. Marstrand, "Pollution of the Seas," in McKnight, Marstrand and Sinclair (eds.), op. cit., pp. 150-173.

[64]Harold and Margaret Sprout suggest that "effects that would once have remained purely local" will "become regional or global" if as substantial change in one sector of the ecosystem "produces significant, often unsettling, sometimes severe disruptive consequences in other sectors." "The Ecological Viewpoint--and Others, "in Cyril E. Black and Richard A. Falk (eds.), The Future of the International Legal Order, Vol. 4, The Structure of the International Environment, (Princeton, Yale University Press, 1972), p. 577. The Trail Smelter decision quoted at note 11 above referred to "serious consequences" that have been "established by clear and convincing evidence."

[65]Harlan Cleveland, op. cit., p. 131.

[66]David Harris, "International Aspects," in McKnight, Marstrand and Sinclair, op.cit., pp. 77-78.

[67]For an example of such a classification, see John Lawrence Hargrove, op.cit., pp. 52-60. For one of the earliest attempts to classify for the purpose of determining international concern, see Clifford S. Russell and Hans H. Landsberg, "International Environmental Problems--A Taxonomy, "Science 172 (1971): 1307-14. This taxonomy distinguishes physical-linkage effects (global, regional) and social-linkage effects (pecuniary, non-pecuniary) and generally takes a conservative view toward the use of international agencies to settle issues (p. 1309). Robert E. Stein and John L. Hargrove present a three-part classification, including the commons, transfrontier pollution, and special problems such as aesthetic concerns in "International Environment Protection: Policy and Legal Aspects," Proc. ASIL, 1977, pp. 48-56. Howard J. and Rita F. Taubenfeld present a taxonomy which focuses on the intent of the actor rather than the seriousness of damage: (1) conscious attempts to modify the environment, (2) activities which inadvertently cause unintentional changes in the environment, (3) activities which clearly cause changes in the environment inadvertently and have not yet been dealt with extensively by the international community. "Modification of the Human Environment," in Black and Falk, op.cit., pp. 124-154. This approach is not useful in determining whether or not an international agency has jurisdiction, but it would contribute to the efforts to set damages at the end of the settlement process.

[68]Man's Impact on the Global Environment, op.cit.

[69]See, for example, E. B. Crowell, "Oil Pollution in Perspective," in E. B. Crowell(ed.), The Ecological Effects of Oil Pollution on Littoral Comm'nities, op. cit., pp. 225-226; Robert A. Shinn, op.cit., pp. 2-30.

[70]For additional evaluations of specific pollutants, see Kirgis; op.cit., pp. 290-320; M'Gonigle and Zacher, op.cit., pp. 14-38; Oscar Schachter and Daniel Ser"er, "Marine Pollution Problems and Remedies," AJIL, 65(1971): 84-111; Pauline K. Marstrand in McKnight, Marstrand and Sinclair, op.cit., pp. 150 ff.

[71]See Günther Handl, "State Liability for Accidental Transnational Environmental Damage by Private Persons," AJIL, 74(1980): 550-554.

[72]Ibid, p. 554.

[73]Assessing Potential Ocean Pollutants, A Report of the National Academy of Science, 1975, p. 4.

[74]Stein and Hargrove, op.cit., p. 51.

[75]"The Sea: Prevention and Control of Marine Pollution," E/5003, 7 May 1971, pp. 22-42.

[76]Shinn, op.cit.

[77]Crowell, op.cit., pp. 225-227.

[78]Shinn op.cit., p. 6. See also the definition in UNDoc. E/5003, 7 May 1971, p. 20.

[79]For a less pessimistic appraisal, see Abraham Chayes, "International Institutions for the Environment," in Hargrove, op.cit., pp. 2-3.

[80]Proc. ASIL, 1977, p. 62.

[81]Schacter and Ser"er, op.cit., p. 85.

[82]Michael Hardy, "The United Nations Environment Program," in Teclaff and Utton, op.cit., p. 57; Shinn, op.cit., p. 178.

[83]Hans Landsberg, during a panel discussion on "Post-Stockholm: Influencing Law and Practice Through International Law and Policy," Proc. ASIL, 1972, p. 5.

[84]Peter H. Sand, "The Role of Domestic Procedures in Transnational Environmental Disputes," in Legal Aspects of Transfrontier Pollution (Paris OECD, 1977), pp. 146-202; Sand, "Trans-Frontier Air Pollution and International Law," Jan-Olaf Williams. New Concepts in Air Pollution Research (New York: John Wiley & Sons, 1974), pp. 107-113.